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RESEARCH AREAS
Thermodynamics, Fluid Mechanics, Heat Transfer, Energy, Statistics, and Intelligent Computer Aided Education.

EDUCATION

Ph.D. (1966) Mech. Engrg.	University of Illinois, Urbana, Illinois, USA
B.S. (1957) and M.S. (1961) Mech. Engrg.	Cheng Kung University, Taiwan, Republic of China

TEACHING EXPERIENCE
1966 - present Assistant professor, Associate Professor, Professor
Department of Mechanical Engineering, U.S. Naval Academy
1968 - present Assistant professor, Associate professor, Professor (part-time)
Whiting School of Engineering, The Johns Hopkins University
1998 - present Graduate Faculty Special Member
University of Maryland

PROFESSIONAL SOCIETIES
American Society of Mechanical Engineers
American Society of Engineering Education
International Society of Thermoelectrics
International Association of Science and Technology for Development

JOURNAL EDITORIAL SERVICES
Editor-in-Chief
International Journal of Energy Systems (1992 -1993)
International Journal of Power and Energy Systems (1993 -1997)
Associate Editor
International Journal of Power and Energy Systems (1997 -present)
Guest Editor
International Journal of Energy, Environment and Economics (1997 - present)
Editorial Advisory Board
Applied Thermal Engineering (1994 - present)
Energy Conversion and Management (1994 - 1999)
International Journal of Energy, Environment and Economics (1995 - present)
International Journal of Exergy (1999 - present)

HONORS AND AWARDS (past eight years)
U.S. Naval Academy Research Excellence Award, 1991.
Meritorious Civilian Service Award, Department of the U.S. Navy, 1991.
Researcher of the Year, Department of Mechanical Engineering, U.S. Naval Academy, 1991.
Service Award, JETS (Junior Engineering and Technology Society), 1991, 1992, 1993, 1994, 1995.
Teaching Excellence Award, Whiting Engineering School, the Johns Hopkins University, 1994.

Teaching Excellence, Department of Mechanical Engineering, U.S. Naval Academy, 1994.
Teaching Excellence (Honorable Mention), U.S. Naval Academy, 1994.
Contribution Award, CAPA (Chinese American Professional Association), 1994.
Contribution Award, U.S. Naval Academy, 1995.
Outstanding Publication Award, The Johns Hopkins University, 1995.
U.S. Navy 30 years Service Award, 1996.
Contribution Award, U.S. Naval Academy, 1996.
Tribute Citation by Washington Chinese News (p38, 20 Sept and 27 Sept 1996)
Contribution Award, U.S. Naval Academy, 1997.
Gratitude (Thank you Professor Wu), International J. of Power and Energy Systems, **17**(3), 1997.
Outstanding Alumni Award, National Cheng Kung University Alumni Foundation, 1999.

PUBLICATIONS

More than 700 publications from 1966 to present in books (3), journal articles (350), conference papers (328), book reviews (15), paper reviews (89), and research reports (38) in the areas of thermodynamics, fluid mechanics, heat transfer, alternative energy, direct energy conversion, shipboard air conditioning systems, lubrication, fire technology, statistics, computer aided instruction, and computer education.

The following books and journal articles lists are for the past six years (1994-2000).

Books

1. Renewable Energy from the Ocean, A guide to Ocean Thermal Energy Conversion, Oxford University Press, England, ISBN 0-19-507199-9, 1994.
   Book review #1 by P.H. Abelson, *Science*, **265**, 419-420, 15 July 1994;
   Book review #2, *IOA (International OTEC/DOWA Association) Newsletter*, **5**(3), 7, 1994;
   Book review #3 by W.G. Sherwood, *Ocean Engineering*, **22**(7), 763, 1995;
   Book review #4 by L.J. Duckers, *Proceedings of the Institute of Mechanical Engineers, Part A : Journal of Power and Energy*, **209**(A3), 248, 1995.
2. Recent Advances in Finite-time Thermodynamics, Nova Science Publ., Inc., New York, ISBN 1-56072-664-4, 1999.

Journal Articles

1. Analysis of an endoreversible Rallis cycle, *Energy Conversion and Management*, **35**(1), 79-85, 1994.
2. Power optimization of an endoreversible Stirling cycle with regeneration, *Energy: The International Journal*, **19**(1), 125-133, 1994.
3. A first order simulation model for shipboard absorption chillers, *International Journal of Power and Energy Systems*, **14**(l), 1-4, 1994.
4. Specific heating load of thermoelectric heat pumps, *Energy Conversion and Management*, **35**(6), 459-464, 1994.
5. Evaluation of shipboard alternate steam production options from engine waste, *International Journal of Power and Energy Systems*, **14**(2), 49-53, 1994.
6. Clarification of finite-time thermodynamic cycle analysis, *International Journal of Power and Energy Systems*, **14**(2), 68-71, 1994.
7. Power potential of a terrestrial solar-radiant Stirling heat engine, *International Journal of Ambient Energy*, **15**(3), 131-140, 1994.
8. Naval ship waste heat recovery, *International Journal of Power and Energy Systems*, **14**(3), 84-86, 1994.
9. Performance of a geothermal heat driven heat pump system, *Energy: The International Journal*, **19**(12), 1219-1224, 1994.
10. The effect of combustion on a power optimized endoreversible Dual cycle, *International Journal of Power and Energy Systems*, **14**(3), 98-103, 1994.
11. Maximum obtainable specific cooling load of a refrigerator, *Energy Conversion and Management*, **36**(1), 7-10, 1995.

12. Maximum obtainable power of a Carnot combined power plant, *International Journal of Ambient Energy*, **15**(4), 351-355, 1995.

13. Design considerations of primary performances for irreversible refrigeration cycles, *International Journal of Ambient Energy*, **16**(1), 17-22, 1995.
14. Maximum specific power of high temperature waste heat engines, *Heat Recovery Systems & CHP*, **15**(4), 13-17, 1995.
15. Energy simulation analysis of shipboard centrifugal chillers, *International Journal of Power and Energy Systems*, **15**(1), 1-3, 1995.
16. Maximum specific power output of a two-stage endoreversible combined cycle, *Energy: The International Journal*, **20**(4), 305-309, 1995.
17. Power optimization of an extra-terrestrial solar-radiant Stirling heat engine, *Energy: The International Journal*, **20**(6), 523-530, 1995.
18. Performance of a heat driven endoreversible cooler, *Energy Conversion and Management*, **36**(11), 1053-1057, 1995.
19. Performance of solar-pond thermoelectric power generators, *International Journal of Ambient Energy*, **16**(2), 59-66, 1995.
20. Optimization of submarine thermoelectric coolers incorporating finite-time thermodynamics, *International Journal of Power and Energy Systems*, **15**(2), 42-47, 1995.
21. Performance potential of a terrestrial solar-radiant Ericsson power cycle from finite-time thermodynamics, *International Power and Energy Systems*, **15**(2), 78-84, 1995.
22. Performance of a cascade endoreversible heat pump system, *The Institute of Energy Journal*, **68**(476), 137-141, 1995.
23. Finite-time thermodynamic analysis of a two-stage combined heat pump system, *International Journal of Ambient Energy*, **16**(4), 205-208, 1995.
24. Analysis of waste heat thermoelectric power generators, *Applied Thermal Engineering*, **16**(1), 63-70, 1996.
25. Maximum specific power output of an irreversible radiant heat engine, *Energy Conversion and Management*, **37**(1), 17-22, 1996.
26. Power limit of an endoreversible Ericsson cycle with regeneration, *Energy Conversion and Management*, **37**(1), 59-66, 1996.
27. Optimization of a two-stage refrigeration system, *Energy Conversion and Management*, **37**(3), 353-358, 1996.
28. Performance of a regenerative Brayton heat engine, *Energy: The International Journal*, **21**(2), 71-76, 1996.
29. General performance characteristics of a finite-speed Carnot refrigerator, *Applied Thermal Engineering*, **16**(4), 299-304, 1996.
30. Power economics of renewable energy endoreversible heat engines, *International Journal of Power and Energy Systems,* **16**(1), 24-28, 1996.
31. A multistage endoreversible refrigerator for low temperature applications, *International Journal of Ambient Energy*, **17**(1), 49-54, 1996.
32. Optimum collector temperature for solar heat engines, *International Journal of Ambient Energy*, **17**(2), 73-78, 1996.
33. General performance characteristics of a N-stage endoreversible combined power cycle system at maximum specific power output, *Energy Conversion and Management*, **37**(9), 1401-1406, 1996.
34. Heat exchanger effect on a gas refrigeration cycle, *Energy Conversion and Management,* **37**(10), 1513-1516, 1996.
35. Performance of an endoreversible Carnot refrigerator, *Energy Conversion and Management,* **37**(10), 1509-1512, 1996.
36. Performance analysis of solar three-heat-reservoir cooling systems, *Energy Conversion and Management*, **37**(11), 1671-1676, 1996.
37. The influence of heat transfer law on the endoreversible Carnot refrigerator, *Journal of the Institute of Energy,* **69**(480), 96-100, 1996.
38. The performance characteristics of a three-heat-source refrigeration cycle, *Applied Thermal*

Engineering, **16**(11), 901-906, 1996 .
39. Heat transfer effect on the specific heating load of heat pumps, *Applied Thermal Engineering,* **16**(12), 989-997, 1996.
40. Effect of heat transfer law on finite time exergeoeconomic performance of heat engines, *Energy: The International Journal* , **21**(12),1127-1134, 1996.
41. Heat transfer effect on the net work and/or power versus efficiency characteristics for the air standard Diesel cycles, *Energy: The International Journal*, **21**(12),1201-1205, 1996.
42. Maximum profit performance of an absorption refrigerator, *International Journal of Energy, Environment and Economics* , **4**(1), 1-7, 1996.
43. Specific power optimization for Carnot combined power plants, *International Journal of Energy, Environment and Economics,* **4**(1), 9-16, 1996.
44. Optimization of steady flow refrigeration cycles, *International Journal of Ambient Energy* **17**(4), 199-206, 1996.
45. A generalized model of real heat engine and its performance, *Journal of the Institute of Energy,* **69**(481), 214-222, 1996.
46. Heat transfer effect on the specific cooling load of refrigerators, *Applied Thermal Engineering*, **17**(1), 103-110, 1997.
47. Finite analysis of a geothermal heat engine driven air conditioning system, *Energy Conversion and Management*, **38**(3), 263-268, 1997.
48. Optimization of solar absorption refrigerator, *Applied Thermal Engineering*, **17**(2), 203-208, 1997.
49. Influence of heat transfer law on the performance of Carnot heat engine, *Applied Thermal Engineering*, **17**(3), 277-282, 1997.
50. Optimum coefficient of performance and heating load relationship of a three-heat-reservoir endoreversible heat pump, *Energy Conversion and Management*, **38**(8), 727-734, 1997.
51. A generalized model of a real refrigerator and its performance, *Applied Thermal Engineering*, **17**(4), 401-412, 1997.
52. Theoretical Analysis of the performance of a regenerative closed Brayton cycle with irreversibilities, *Energy Conversion and Management*, **38**(9), 871-877, 1997.
53. Finite-time thermodynamic performance of an isentropic closed regenerative Brayton refrigeration cycle, *International Journal of Energy, Environment and Economics*, **4**(4), 261-274, 1997.
54. Performance analysis of an irreversible Brayton heat engine, *Journal of the Institute of Energy*, **70**(482), 2-8, 1997.
55. Power performance of naval shipboard gas turbines, *International Journal of Power and Energy Systems*, **17**(2), 107-110, 1997.
56. Maximum power of a combined cycle isothermal chemical engine, *Applied Thermal Engineering,* **17**(7), 629-637, 1997.
57. Steady flow combined refrigeration cycle performance with heat leak, *Applied Thermal Engineering,* **17**(7), 639-645, 1997.
58. Optimal performance of an endoreversible Carnot heat pump, *Energy Conversion and Management*, **38**(14), 1439-1444, 1997.
59. Influence of internal heat leak on the power vs efficiency characteristics of heat engines, *Energy Conversion and Management*, **38**(14), 1501-1508, 1997.
60. Optimal performance coefficient and cooling load relationship of a three-heat-reservoir endoreversible refrigerator, *International Journal of Power and Energy Systems*, **17**(3), 206-208, 1997
61. Preliminary design optimization of a marine dual tandem gear, *International Journal of Power and Energy Systems*, **17**(3), 218-222, 1997.
62. Heat pump performance with internal heat leak, *Internationa*l *Journal of Ambient Energy*, **18**(3), 129-134, 1997.
63. Performance characteristic of isothermal chemical engines, *Energy Conversion and Management*, **38**(18), 1841-1846, 1997.
64. Using articulate virtual laboratories in teaching energy conversion at the U.S. Naval Academy, *Journal of Educational Technology Systems*, **26**(2), 127-136, 1997.

65. The equivalent cycles of an n-stage irreversible combined refrigeration system, *International Journal of Ambient Energy*, **18**(4), 197-204, 1997.
66. Exergeconomic performance bound and optimization criteria for heat engines, *International Journal of Ambient Energy*, **18**(4), 216-218, 1997.
67. Influence of internal heat leak on the performance of refrigerators, *Energy Conversion and Management*, **39**(½), 45-50, 1998.
68. Optimization of the specific rate of heat pumping in combined heat pump cycles, *Energy Conversion and Management* **39**(½), 113-116, 1998.
69. Cooling load versus COP characteristics for an irreversible air refrigeration cycle, *Energy Conversion and Management*, **39**(½), 117-126, 1998.
70. Optimal collector temperature for solar-driven heat pumps, *Energy Conversion and Management*, **39**(½), 143-155, 1998.
71. Optimal expansion of a heated working fluid with phenomenological heat transfer, *Energy Conversion and Management*, **39**(3/4), 149-156, 1998.
72. Efficiency of an Atkinson engine at maximum power density, *Energy Conversion and Management*, **39**(3/4), 337-342, 1998.
73. Optimization of steady flow heat pumps, *Energy Conversion and Management,* **39**(5/6), 445-454, 1998.
74. Effect of heat transfer law on finite time exergeoeconomic performance of a Carnot heat pump cycles, *Energy Conversion and Management*, **39**(7), 579-588, 1998.
75. Heat transfer effects on the net work output and efficiency characterisitic for an air-standard Otto cycles, *Energy Conversion and Management*, **39**(7), 643-648, 1998.
76. Intelligent computer aided optimization on specific power of an OTEC Rankine power plant, *Applied Thermal Engineering*, **18**(5), 295-300, 1998.
77. Optimum performance of reversible Stirling engine with imperfect regeneration*, Energy Conversion and management*, **39**(8), 727-732, 1998.
78. Performance and optimization criteria for forward and reverse quantum Stirling cycles, *Energy Conversion and management*, **39**(8), 733-740, 1998.
79. Optimal configuration of a class of two heat reservoir refrigeration cycles, *Energy Conversion and management* , **39**(8), 767-773, 1998.
80. Optimum design of centrifugal compressor stages, *International Journal of Power and Energy Systems*, **18**(1), 12-15, 1998.
81. Multi-objective optimization method for a radial-axial flow turbine with criteria of optimum twist at outlet of blade, *International Journal of Power and Energy Systems* , **18**(1), 16-20, 1998.
82. Intelligent computer aided design on optimization of specific power of finite-time Rankine cycle using CyclePad, *Journal of Computer Application in Engineering Education*, **6**(1), 9-13, 1998.
83. Performance analysis of an irreversible reheat Brayton refrigerator, *Cryogenics (in Chinese),* **101**(1), 13-19, 1998.
84. Intelligent computer aided analysis of a Rankine/Rankine combined cycle, *International Journal of Energy, Environment and Economics*, **7**(2), 239-244, 1998.
85. Optimum performance parameters for a quantum Carnot heat pump with spin ½, *Energy Conversion and Management*, **39**(11), 1161-1168, 1998.
86. Performance of chemical engine with mass leak, *Journal of Physics, D*: *Applied Physics*, **31**(13), 1595-1600, 1998.
87. Finite-time power limit for solar radiant Ericsson engines in space applications, *Applied Thermal Engineering*, **18**(12), 1347-1358, 1998.
88. Analysis of multi-objective decision making for marine steam turbine stages, *International Journal of Power and Energy Systems*, **18**(2), 96-101, 1998.
89. Finite thermal reservoirs effects on power optimized continuous endoreversible Carnot heat engine cycles, *International Journal of Power and Energy Systems*, **18**(2), 147-154, 1998.
90. Intelligent computer aided instruction of heat pump, *Computers in Education Journal*, **8**(3), 36-42, 1998.
91. Intelligent computer aided design of geothermal plants, *Renewable Energy,* **16**(4), 2713-2717, 1998.

92. Performance characteristic of fluid power converters, *Journal of the Institute of Energy*, **71**(486), 209-215, 1998.
93. Progress in finite time thermodynamics, *Progress in Physics (in Chinese)*, **18**(4), 395-422, 1998.
94. Intelligent computer aided sensitivity analysis of a multi-stage Brayton/Rankine combined cycle, *Energy Conversion and Management*, **40**(2), 215-232, 1999.
95. Performance analysis for endoreversible closed regenerated Brayton heat Pump cycles, *Energy Conversion and Management*, **40**(4), 393-406, 1999.
96. Effect of heat transfer law on the performance of generalized irreversible Carnot engine, *J. Phys. D:Appl. Phys.,* **32**(2), 99-105, 1999.
97. Optimal performance of an irreversible Stirling cryocooler, *International Journal of Ambient Energy*, **20**(1), 39-44, 1999.
98. Influence of internal irreversibility and heat transfer law on the performance of refrigerator, *Journal of Engineering Thermodynamics (in Chinese),* **20**(1), 13-16, 1999.
99. Intelligent computer aided design, analysis, optimization and improvement of thermodynamic systems, *Thermodynamic Optimization of Complex Energy Systems (book editors: by A. Bejan and E. Mamut), Kluwer Academic Publishers*, Netherlands, 437-444, 1999.
100. Intelligent computer aided optimization of power and energy systems, *Proceedings of the Institution of Mechanical Engineers, Part A, Journal of Power and Energy*, **213**(A1), 1-6, 1999.
101. Performance analysis for a real closed regenerated Brayton cycle via methods of finite-time thermodynamics, *International Journal of Ambient Energy,* **20**(2), 95-104, 1999.
102. Effect of heat transfer law on the performance of a generalized Carnot heat pump, *Journal of the Institute of Energy*, **72**(2), 64-68, 1999.
103. Transient flow phenomena in the regenerator tube of a magnetic heat pump, *International Journal of Power and Energy Systems*, **19**(1), 38-47, 1999.
104. Performance characteristic of an endoreversible Stirling refrigerator, *International Journal of Power and Energy Systems*, **19**(1), 79-82, 1999.
105. Effect of heat transfer law on the performance of generalized irreversible Carnot refrigerator, *J. of Engineering Thermophysics ,* **20**(2), 10-13, 1999.
106. Progress in finite-time thermodynamics, *Recent Advances in Finite Time Thermodynamics (Editors: C. Wu, L. Chen and J. Chen),* Nova Science Publishers, NY, 1-35, 1999.
107. Generalized power optimization of regenerative reciprocating Stirling-like heat engines with various heat transfer mode combinations and finite non-interactive thermal reservoirs, *Recent Advances in Finite Time Thermodynamics (Editors: C. Wu, L. Chen and J. Chen),* Nova Science Publishers, NY, 49-64, 1999.
108. Heating rate limit and cooling rate limit of a reversed reciprocating Stirling cycle, *Recent Advances in Finite Time Thermodynamics (Editors: C. Wu, L. Chen and J. Chen),* Nova Science Publishers, NY, 85-96, 1999.
109. Combined law power optimization of closed Joule-Brayton heat engine cycle with finite non-interactive thermal reservoirs, *Recent Advances in Finite Time Thermodynamics (Editors: C. Wu, L. Chen and J. Chen),* Nova Science Publishers, NY, 105-120, 1999.
110. Finite time thermodynamic analysis of a MHD power plant, *Recent Advances in Finite Time Thermodynamics (Editors: C. Wu, L. Chen and J. Chen),* Nova Science Publishers, NY, 227-235, 1999.
111. A generalized model of a combined heat pump cycle and its performance, *Recent Advances in Finite Time Thermodynamics (Editors: C. Wu, L. Chen and J. Chen),* Nova Science Publishers, NY, 489-502, 1999.
112. Finite thermodynamics performance of a Dual cycle, *International Journal of Energy Research*, **23**(9), 765-772, 1999.
113. Maximum profit performance of a three-heat-reservoir heat pump, *International Journal of Energy Research*, **23**(9), 773-778, 1999.
114. Steady flow combined power plant performance with heat leak*, International Journal of Power and Energy Systems*, **19**(2), 103-106, 1999.
115. Effect of heat resistance on the performance of closed gas turbine regenerative cycles, *International Journal of Power and Energy Systems*, **19**(2), 141-145, 1999.
116. A generalized model of a combined refrigeration cycle and its performance, *International Journal of*

Thermal Sciences (Revue Generale de Thermique), **38**(8), 712-718, 1999.

117. Performance of combined-cycle chemical engines with mass leak, *Journal of Non-Equilibrium Thermodynamics*, **24**(3), 280-290, 1999.
118. Influence of nonlinear flow resistance relation on the power and efficiency from fluid flow, *J. Phys. D:Appl. Phys.,***32**(12), 1346-1349, 1999.
119. Performance analysis of a closed regenerated Brayton heat pump with internal irreversibilities, *International Journal of Energy Research*, **23**, 1039-1050, 1999.
120. Universal power optimized work potential for reciprocating endoreversible Carnot heat engine cycles with linear external heat transfer, *International Journal of Power and Energy Systems*, **19**(3), 202-211, 1999.
121. Performance of real regenerated air heat pump, *International Journal of Power and Energy Systems*, **19**(3), 231-238, 1999.
122. Intelligent computer aided optimization of reheating in Rankine cycles, *International Journal of Ambient Energy*, **20**(4), 171-176, 1999.
123. A Generalized model of a real combined power plant and its performance, *International Journal of Energy, Environment and Economics*, **9**(1), 35-49, 1999.
124. Teaching Rankine cycle by using an intelligent computer aided instruction software, *The International Journal of Mechanical Engineering Education*, **27**(4), 337-346, 1999.
125. Thermodynamics for finite-time process and finite-time size devices, *Science (in Chinese)*, **21**(5), 275-278, 1999.
126. Finite time thermodynamic optimization or entropy generation minimization of energy systems, *Journal of Non-Equilibrium Thermodynamics*, **24**, 327-359, 1999.
127. Finite time exergoeconomic performance bound for a quantum Stirling engine, *International Journal of Engineering Science*, **38**(2), 239-247, 2000.
128. Intelligent computer aided simulation, design and improvement of heat pump, *Simulation*, **74**(1), 18-27, 2000.
129. A combined law power optimized open Joule-Brayton heat engine cycle with a fixed-finite thermal reservoir, *International Journal of Power and Energy Systems*, **20**(1), 1-6, 2000.
130. Cooling and heating rate limits of a reversed reciprocating Ericsson cycle at steady state, *Proceedings of the Institute of Mechanical Engineers, Part A, Journal of Power and Energy*, **214**, 75-85, 2000.
131. The maximum cooling rate of an irreversible magnetic Stirling refrigeration cycle for a given power input, *International Journal of Energy, Environment and Economics* (accepted).
132. Heat transfer effect on the specific cooling load of refrigerators, *Applied Thermal Engineering* (accepted).
133. Method of Thermoeconomical Optimisation of Energy-intensive Systems with Linear Structure on Graphs, *International Journal of Energy Research*, (in press).
134. Optimum allocation of heat exchanger area and its application to naval shipboard refrigeration and air conditioning plants, *International Journal of Energy, Environment and Economics*, (accepted).
135. Performance of a class of irreversible heat engines, *International Journal of Energy, Environment and Economics* (accepted).
136. Heat recovery from naval air conditioning plant, *International Journal of Power and Energy Systems,* (accepted).
137. Intelligent computer aided simulation of a thermodynamic cycle, *International Journal of Modeling and Simulation*, (accepted).
138. Heat transfer effect on the performance of an endoreversible heat engine, *International Journal of Energy, Environment, and Economics* (accepted).
139. Ground heat exchanger for GSHP system, *International Journal of Power and Energy Systems*, (accepted).
140. The influence of several major irreversibilities on the performance characteristics of an n-stage combined heat pump system, *International Journal of the Institute of Applied Thermodynamics*, (accepted).
141. Thermodynamic optimization of a multi-couple thermoelectric heat pump system, *International Journal of Energy, Environment and Economics*, (in press).
142. Effect of heat transfer law on the finite time exergoeconomic performance of a Carnot heat pump,

International Journal of Exergy, (accepted).

143. Exergy analysis for a Braysson cycle, *International Journal of Exergy*, (accepted).
144. Analysis on the performance of a thermoelectric generator, *ASME Journal of Energy Resources Technology*, (In press).
145. Intelligent computer aided design optimization of heat pump, *International Journal for product and process improvement,* (accepted).
146. Measurement of a solar-ground source heat pump with vertical double spiral coil ground heat exchanger, *International Journal of Ambient Energy*, (accepted).
147. The heat capacities of gases in arbitrary process, *The International Journal of Mechanical Engineering Education*, (accepted).
148. Optimization of irreversible magnetic Stirling cryocoolers*, International Journal of Engineering Science,*(accepted).

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